Impact of pharmacist's intervention on disease related knowledge, medication adherence, HRQoL and control of blood pressure among hypertensive patients

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Abstract: The present study was aimed to evaluate the effect of educational intervention provided to the patients of hypertension through pharmacist with the goal to improve knowledge about hypertension, adherence to prescribed medicines, blood pressure control and HRQoL (Health Related Quality of Life). A total of 384 patients were assigned randomly into 2 groups including intervention and control groups each having 192 patients. Urdu versions of knowledge questionnaire regarding hypertension, medication adherence scale (MMAS-U) by Morisky and EuroQol scale (EQ-5D) were utilized. Each patient's blood pressure was measured. After educational intervention, an increase was found in mean knowledge score about hypertension (18.18 ± 4.00), adherence score (5.89 ± 1.90), HRQoL score (0.73 ± 0.12) and Visual Analogue Scale (VAS) score (69.39 ± 5.90) among the IG. The blood pressure control also improved and lower systolic (131.81 ± 10.98 mmHg) and diastolic blood pressures (83.75 ± 6.21 mmHg) were observed among the patients of IG. This study showed that educational programs are useful for patients in increasing patient's levels of knowledge about hypertension, improving adherence to prescribed medication and enhancing blood pressure control. This increase is in turn accountable to improve HRQoL.

Keywords: Pharmacist's intervention, adherence, blood pressure control and sphygmomanometer.

INTRODUCTION

Hypertension (HTN) is the leading worldwide concern. It is one of the basic avoidable risk factors for cardiovascular diseases. It has a great disturbing effect on people's health and results in needless morbidity and mortality. Hypertension alone is believed to be responsible for >5.8 % of death all over the world, loss of 11.9 % year of life as well as adjusted life of 1.4 %. For researchers of health care, assessment, management as well as control of hypertension is still a big challenge (Kannel, 1996).

Hypertension is becoming a major clinical and public health issue in Pakistan (Saleem *et al*., 2011). It was reported that that prevalence of hypertension is 33% in Pakistan. Every 3rd individual aged above 40 years becoming increasingly susceptible to different diseases (Saleem *et al*., 2010). For the treatment of hypertension, guidelines and evidence-based management have been made available since 1990s. however, the blood pressure control still remains a big challenge for health-care providers (Godley *et al*., 2001). It was also reported that only fifty percent of the hypertensive patients were diagnosed and only half of these diagnosed patients were ever treated. Correct medication was prescribed to half of those patients who were treated for hypertension in order to control the condition effectively. Therefore, only 12.5% cases of hypertension were controlled adequately (Saleem *et al*., 2010). This uncontrolled hypertension might result from either patient-related or physician related barriers. Major barriers related to patient in achieving target goal of blood pressure include poor adherence to medication, patient's beliefs regarding hypertension as well as its treatment, low literacy of health and lacking of social support (Ogedegbe, 2008). Barriers which are Patient-centered are adjustable. However, beliefs of patient and attitudes towards use of medication cannot be entrenched.

In Pakistan, the deficiency of health-care services as well as the poor infrastructure for health-care are the major hurdles in controlling the emerging epidemic of hypertension. Health care services are also very expensive as well as patients have to pay majority of health care costs by themselves. Lack of health care facilities, shortage of health care professionals and insufficient allocation of health budget are major barriers to delivery of optimal and quality health care. Most of the times, the

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patient is unable to bear the high cost of treatment for such chronic diseases (Govender *et al*., 2007; Khuwaja *et al*., 2010). In addition to this, no well- established procedure of collaborative patient care exists. The reason is that the key players in the health care system are still bickering over roles and responsibilities, a situation that has adversely affected patient care services (Brunner *et al*., 2009; Joyner-Grantham *et al*., 2009). Moreover, physicians are too busy and cannot spend sufficient time to counsel and deliver knowledge to the patients. Majority of the patients, in turn tend to visit other healthcare providers like Hakeems and Homeopaths (Unani-Tib) before consulting certified practitioners (ul Haq *et al*., 2012).

It has been reported in different studies that hypertensive patients can take benefit from such interventions which focus on increasing knowledge about hypertension and adherence to prescribed medicines (Guirado *et al*., 2011). So, this study was aimed to evaluate the impact of educational intervention provided to the patients of hypertension through pharmacist with the goal to improve knowledge of patients about hypertension, adherence to prescribed medication, blood pressure control and HRQoL.

MATERIALS AND METHODS

Study design and settings

A non-clinical and randomized control trial (RCT) was designed to conduct the current study. A simple randomizing procedure was used for randomly distribution of the enrolled patients. The enrolled hypertensive patients were independently randomized with an allocation ratio of 1:1 to one of the two parallel groups. Since the rate of prevalence of hypertension is 33% in Pakistan (Saleem *et al*., 2011), therefore, by using Raosoft software available on line (on prevalence basis), a sample of 384 patients (Daniel and Cross, 2010) was recruited from Federal Government Polyclinic (Post Graduate Medical Institute). It is the second largest tertiary care hospital in Islamabad, Pakistan and provides diagnostic and treatment facilities to the poor and middle-income classes. People of different races from all over Pakistan reside in Islamabad (Capital of Pakistan) and as such patients of different races visit this hospital to receive the treatment. Patients were recruited into the study via referral from physicians and consultants in cardiology Out Patient Department (OPD) of the hospital. The study was conducted from August, 2017 to April, 2018 and during this duration, baseline data collection of the recruited patients, providing pharmacist's intervention and collection of post intervention data was carried out.

Inclusion criteria

Patients having age of thirty years and above, diagnosed with hypertension, taking treatment for high blood pressure for the last six months and patients with the ability to write or speak Urdu (Pakistan's official language) were recruited in this study.

Exclusion criteria

Patients having age less than thirty and greater than seventy years, pregnant women, patients, with co-morbidities, patients having dementia as well as immigrants were excluded from this study.

Ethical approval

The study was conducted as per guidelines provided by the Joint National Committee (JNC) for the management of hypertension. Approval from the ethical committee of Polyclinic hospital was taken to carry out the study (approval No. FGPC.1/12/2016/Ethical Committee).

Consent from study patients

Before data collection, nature as well as objectives of this study were explained to patients of who showed willingness to participate and were assured of confidentiality of the information. Patients were informed about their right of withdrawal from study without any penalty or effect on their treatment. Prior to collection of data, written consent was also taken from patients.

Study variables and instruments

The knowledge about hypertension, adherence to medication, blood pressure and HRQoL among hypertensive patients was assessed in this study. In addition to the demographic data and information regarding disease, Urdu versions (official language of Pakistan) of self-administered and pre-validated knowledge questionnaire about hypertension, medication adherence scale by Morisky (MMAS-U) and EuroQol (EQ-5D) scale were utilized. Blood pressure of each enrolled patients was measured through a calibrated sphygmomanometer and mean (SD) systolic blood pressure (SBP) and diastolic blood pressure (DBP) of patients were measured.

Sampling criteria, baseline analysis and randomization

Three hundred and eight-four patients of hypertension were included in the study. Patients were recruited into the study via referral from physicians and consultants in cardiology OPD of hospital. Following baseline assessment, randomization of the patients was done by using coin toss method in which heads indicated intervention group (IG) whereas tails indicated control group (CG) each having 192 patients. Each patient's blood pressure at baseline after the intervention and was measured through a calibrated sphygmomanometer and mean (SD) systolic and diastolic blood pressures of patients were measured.

Development and application of the intervention

Pharmaceutical care was provided to the IG almost for about fifteen minutes on the first visit and for roughly

about ten minutes on their follow-up visits. A physician also acted as an observer during the whole process. The follow up visits of patients with pharmacist were scheduled after every one and a half months and total three interventions were given by the pharmacist. A thorough interview of the study patients was conducted by the pharmacist at each visit. Pharmacist identified those issues leading to the poor adherence towards medication and also provided disease related education to the patient (hypertension-related information, lifestyle education, medication counselling tips to increase knowledge about hypertension, adherence to medication and HRQoL). A printed booklet (in Urdu language) of hypertension related educational material was provided to the patients in the IG. All patients in the IG received the same educational input. However, no educational sessions were provided to the CG during the study duration. Thus, the IG, received standard care (provided by physician during scheduled visit to hospital) as well as pharmaceutical care provided through the pharmacist's intervention while the CG received standard care only (provided by physician during scheduled visit to hospital).

Data collection and statistical analysis

Baseline assessment (pre-intervention) of hypertension related knowledge, medication adherence, HRQoL and blood pressure was done during the initial recruitment phase. After the completion of intervention, post analysis was performed for both IG and CG so as to assess the effect of educational intervention that was provided by the pharmacist. The nature of the data was established by using the Kolmogorov-Smirnov test and non-parametric statistical tests were performed accordingly. Demographic data and hypertension related information of the patients was described by using descriptive statistics. Descriptive statistics were utilized to explain demographic and hypertension related information of the patients. For the categorical variables, frequencies and percentages were used, whereas for the normally distributed continuous variables, mean with standard deviations were also calculated. The characteristics of study sample, knowledge scores about hypertension, adherence scores, blood pressure values and HRQoL were also presented. Inferential statistics were performed to assess impact of Pharmacist's intervention. Differences between the categorical variables were analysed by Chi square test. Significance among IG and CG was compared by using Mann-Whitney test. Wilcoxon signed rank test was used to calculate the inter-group comparison. A statistical value of less than 0.05 was considered as significant. The Statistical Package for the Social Sciences (SPSS) software, version 21.0 (SPSS Inc., Chicago, IL, USA) was used to analysed the collected data.

RESULTS

The sample, 384 hypertensive patients at Federal Government Polyclinic (Post Graduate Medical Institute) was assigned to two groups, intervention group (IG) (192 individuals) and control group (CG) (192 individuals) respectively. Fig. 1 shows the detailed conceptual frame work of the study.

Knowledge about hypertension, adherence to medication, blood pressure control and HRQoL were the main outcome measures that were measured both at baseline and after completion of intervention. The IG and CG were compared in terms of age, gender, marital status, education, occupation, monthly income, location and duration of disease. Knowledge about hypertension was found average (12.99±5.33, 13.52± 4.98) at baseline in IG and as well as in CG. Adherence to medication was also found as low (4.34±2.75, 4.97±2.71) in both the groups. The control of systolic blood pressure (141.41±15.302, 139.38±15.641) and diastolic blood pressure (88.49± 9.340, 88.98 ± 11.90) among the patients of both groups was also poor. Participants of IG showed average (0.6919±0.1486), whereas CG showed poor HRQoL (0.5993±0.2851). In addition, Visual Analogue Scale (VAS) score among IG as well as CG (67.56±5.314, 66.09±6.24) was also poor. The baseline analysis of the whole cohort is shown in table 1.

384 patients were enrolled in the study and 308 patients (80.21%) completed the study, one hundred and sixty (83.33%) in IG and one hundred and forty-eight (77.08%) in CG. The reasons for withdrawal were a job, family-related and inability to attend the follow-up visits. The study demonstrated a non-significant association when disease-related and socio-demographics variables were compared except in case of gender where statistically significant association (P=0.046) was found among IG and CG. A statistically significant difference was noticed (P<0.001), however, when knowledge, adherence, blood pressure control and HRQoL scores were compared between IG and CG after completion of the intervention. There was an increase in mean of hypertension related knowledge score (18.18±4.00), adherence score (5.89± 1.90), HRQoL score (0.73±0.12) and VAS score (69.39± 5.90) among the IG. In addition, the blood pressure control also improved and lower systolic (131.81±10.98 mmHg) and diastolic blood pressures (83.75±6.21 mmHg) were observed among the patients of IG. The CG was almost same in terms of knowledge regarding hypertension, adherence to medication, HRQoL, blood pressure control and little difference was found in comparison to the baseline analysis. When VAS score was compared with the analysis of baseline, a small decline (64.29±4.77) was observed in CG.

Wilcoxon signed-rank test was used to find out differences between intergroup (pre- and post-IG) variables. The inter-group evaluation among the IG (pre-intervention and post-intervention) is shown in table 3.

A significant difference was found (P<0.001) when knowledge regarding hypertension, adherence to

Table 1: Baseline characteristics of study participants

Characteristics	Entire cohort n=384, n (%)	Intervention group (IG) n=192, n (%)	Control group (CG) n = 192, n (%)
Age (Years)			
30-40	61 (15.9)	31 (16.1)	30 (15.6)
41-50	138 (35.9)	64 (33.3)	74 (38.5)
51-60	125 (32.6)	63 (32.8)	62 (32.3)
61-70	60 (15.6)	34 (17.7)	26 (13.5)
Gender			
Male	215 (56)	117 (60.9)	98 (51.0)
Female	169 (44)	75 (39.1)	94 (49.0)
Marital Status			
Married	383 (99.7)	190 (100.0)	191 (99.5)
Unmarried	0 (0.00)	0 (0.00)	0 (0.00)
Widow	1 (0.30)	0 (0.00)	1 (0.5)
Education			
Illiterate	87 (22.7)	14 (7.3)	73 (38.0)
Primary	37 (9.6)	15 (7.8)	22 (11.5)
Middle	58 (15.1)	30 (15.6)	28 (14.6)
Matriculation	101 (26.3)	60 (31.3)	41 (21.4)
Intermediate	29 (7.6)	20 (10.4)	9 (4.7)
Graduate	47 (12.2)	36 (18.8)	11 (5.7)
Postgraduate	25 (6.5)	17 (8.9)	8 (4.2)
Occupation			
Private Job	47 (12.2)	18 (9.4)	29 (15.1)
Government Job	121 (31.5)	75 (39.1)	46 (24.0)
Businessman	0 (0.00)	0 (0.00)	0 (0.00)
Housewife/House Maker	156 (40.6)	64 (33.3)	92 (47.9)
Retired	60 (15.6)	35 (18.2)	25 (13.0)
Jobless	0 (0.00)	0 (0.00)	0 (0.00)
Monthly Income (Pak Rs)			
Nil	157 (40.9)	64 (33.3)	93 (48.4)
5000 – 10000	2 (0.50)	0 (0.00)	2 (1.0)
10001 – 15001	4 (1.00)	2 (1.0)	2 (1.0)
> 15001	221 (57.6)	126 (65.6)	95 (49.5)
Location			
Urban	220 (57.3)	123 (64.1)	97 (50.5)
Rural	164 (42.7)	69 (35.9)	95 (49.5)
Duration of Disease			
<1Year	80 (20.8)	39 (20.3)	41 (21.4)
1 – 3Years	164 (42.7)	84 (43.8)	80 (41.7)
3 – 5Years	26 (6.8)	12 (6.3)	14 (7.3)
> 5Years	114 (29.7)	57 (29.7)	57 (29.7)
Baseline knowledge score (mean ± SD)	13.26 (5.16)	12.99 (5.33)	13.52 (4.98)
Baseline adherence score (mean ± SD)	4.66 (2.743)	4.34 (2.75)	4.97 (2.71)
Baseline EQ-5D score (mean ± SD)	0.6456 (0.2317)	0.6919 (0.1486)	0.5993 (0.2851)
Baseline VAS score (mean ± SD)	66.83 (5.832)	67.56 (5.314)	66.09 (6.24)
Baseline SBP (mean ± SD) mmHg	140.39 (15.485)	141.41 (15.302)	139.38 (15.641)
Baseline DBP (mean ± SD) mmHg	88.74 (10.683)	88.49 (9.340)	88.98 (11.90)

medication, blood pressure and HRQoL were compared. Wilcoxon signed-rank test was also used to find out differences between intergroup (pre- and post-CG) variables. Table 4 describes the inter-group evaluation among the CG (pre-intervention and post-intervention). Adherence as well as VAS scores were significantly reduced between pre- and post- CG. No significant difference was found in hypertension knowledge, EQ-5D, and blood pressure among the CG (pre-intervention and post-intervention).

DISCUSSION

Human behavior plays a key role in the prevention of disease and maintenance of health. It has been suggested by the growing evidence that effective programs conducted to change health behavior of an individual requires a multifaceted approach to helping individuals adopt, change as well as maintain behavior (Sharby, 2005). In modifying attitudes and beliefs, interventions are effective and can produce behavioral changes in

Table 2: Post Interventional analysis between IG and CG

Characteristics	IG n=160, n (%)	CG n=148, n (%)	P-value
*Age			
30-40	28 (17.5)	18 (12.2)	0.186
41-50	58 (36.3)	62 (41.9)	
51-60	48 (30.0)	49 (33.1)	
61-70	26 (16.3)	19 (12.8)	
*Gender			
Male	94 (58.8)	74 (50)	0.046
Female	66 (41.3)	74 (50)	
*Marital Status			
Married	160 (100)	147 (99.3)	--
Unmarried	0 (0.00)	0 (0.00)	
Widow	0 (0.00)	1 (0.7)	
*Education			
Illiterate	12 (7.5)	63 (42.6)	0.875
Primary	13 (8.1)	19 (12.8)	
Middle	27 (16.9)	20 (13.6)	
Matriculation	44(27.5)	31 (20.9)	
Intermediate	19 (11.9)	5 (3.4)	
Graduate	29 (18.1)	7 (4.7)	
Postgraduate	16 (10.0)	3 (2.0)	
*Occupation			
Private job	14 (8.8)	23 (15.5)	0.142
Government job	64 (40.0)	33 (22.3)	
Businessman	0 (0.00)	0 (0.00)	
Housewife/ homemaker	55 (34.4)	73 (49.3)	
Retired	27 (16.9)	19 (12.8)	
Jobless	0 (0.00)	0 (0.00)	
*Monthly Income (Pak Rs)			
Nil	56 (35.0)	74 (50.0)	0.147
5000–10000 (PKR)	0 (0.00)	1 (0.7)	
10001–15001 (PKR)	2 (1.3)	2 (1.3)	
>15001 (PKR)	102 (63.8)	71 (48.0)	
*Location			
Urban	105 (65.6)	71 (48.0)	0.129
Rural	55 (34.4)	77 (52.0)	
*Duration of disease			
<1 year	32 (20)	27 (18.2)	0.456
1–3 years	73 (45.6)	66 (44.6)	
3–5 years	10 (6.3)	13 (8.8)	
>5 years	45 (28.1)	42 (28.4)	
**Knowledge score (mean ±SD)	18.18 (4.00)	13.31 (4.87)	<0.001
**Adherence score (mean ±SD)	5.89 (1.90)	3.89 (1.19)	<0.001
**EQ-5D score (mean ±SD)	0.73 (0.12)	0.649 (.23)	<0.001
**VAS score (mean ±SD)	69.39 (5.90)	64.29 (4.77)	<0.001
**SBP, (mean ±SD)	131.81 (10.98)	137.91 (12.02)	<0.001
**DBP, (mean ±SD)	83.75 (6.21)	87.77 (7.72)	<0.001

*Chi-square test, **Mann–Whitney U-test

population (Saounatsou *et al*., 2001). Interventions of such kind also create opportunities for patients to understand their conditions in better way and clarify their misapprehensions about their disease as well as its treatment (Gao *et al*., 2000). Luckily, attitudes of patient towards disease as well as its treatment are not constant. However, sometimes beliefs of patient acquire from misperceptions regarding disease and use of medication (Horne, 1993; Horne, 1999). It has also been identified that inadequate knowledge is one of the major causes that influences the adherence behavior (Bender, 2002). It can, therefore, be hypothesized easily that providing education to the patients through a well-planned intervention can result in the better awareness of the disease, increased in adherence to medication and better control of disease leading ultimately to improved HRQoL. The intervention in our study consisted of an educational program which was focused on improving hypertension related knowledge and making patients aware of the importance of medication adherence.

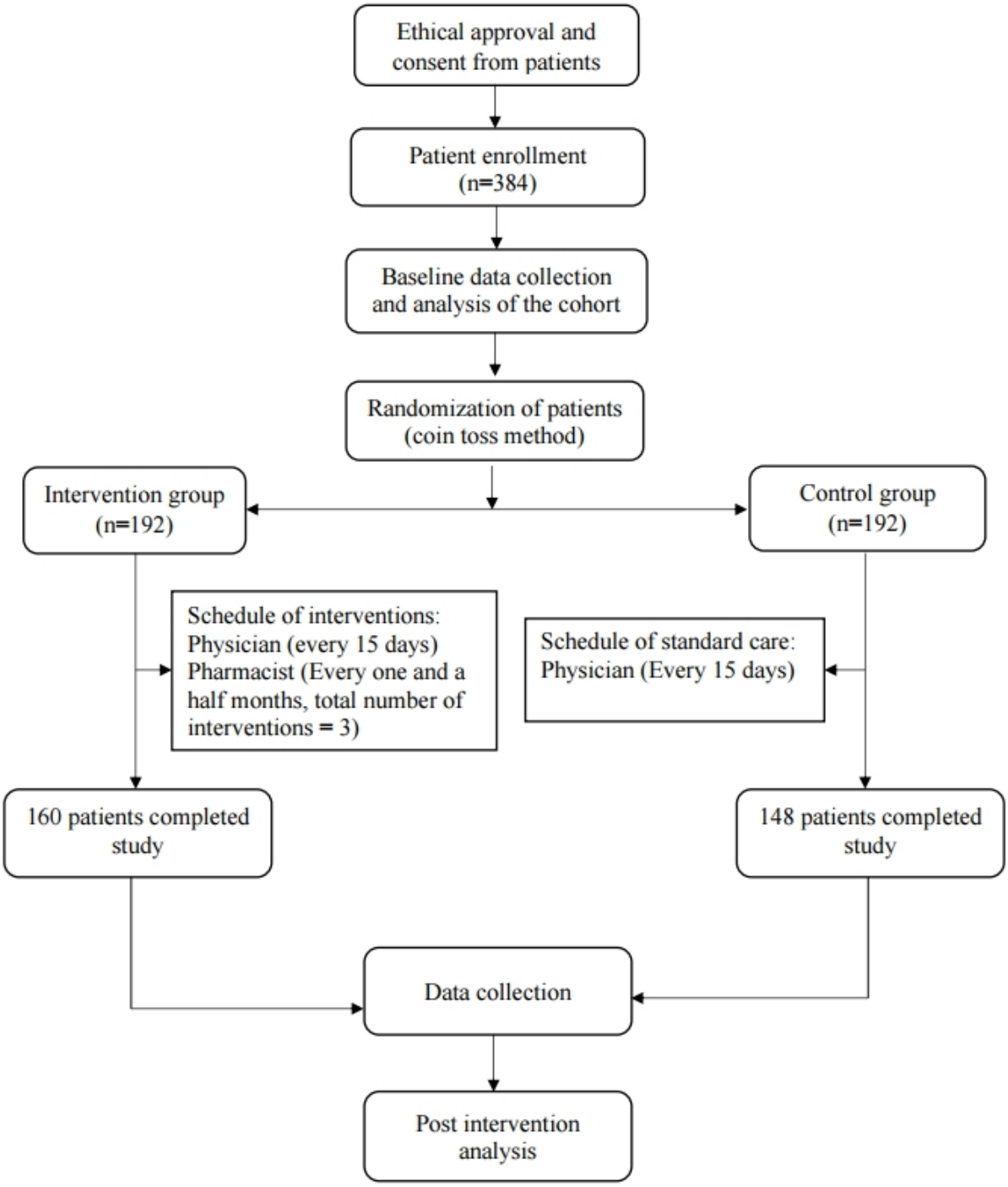

Fig. 1: Conceptual frame work of study

Such Pharmacist's intervention study on hypertensive patients has been conducted for the first time in this region. Since questionnaires were developed in Urdu (National language of Pakistan) and education material was also provided to the hypertensive patients in Urdu, therefore, no language barrier was faced in the completion of this study.

Results from our study showed that a significant increase was found in the hypertension knowledge score among patients of IG after intervention. An increase was found in mean of hypertension related knowledge score (18.18± 4.00) among the patients of IG. This is an indication that patients learned more about their disease than they knew before intervention.

Table 3: Differences in variables between pre- and post-IG (n=160)

Variable	Pre-IG Mean (Median)	Post-IG Mean (Median)	P-value*
Knowledge	12.95 (12)	18.18 (20)	<0.001
Adherence	4.43(4)	5.89 (6)	<0.001
EQ-5D	0.69 (0.73)	0.73 (0.73)	<0.001
VAS	67.81(68)	69.39 (70)	<0.001
SBP	141.19 (140)	131.81(130)	<0.001
DBP	88.25 (90)	83.75 (80)	<0.001

Table 4: Differences in variables between pre- and post-CG (n=148)

Variable	Pre-CG Mean (Median)	Post-CG Mean (Median)	P-value*
Knowledge	13.22 (13)	13.31 (13)	0.387
Adherence	4.93 (6)	3.89 (4)	<0.001
EQ-5D	0.637 (0.73)	0.649 (0.73)	0. 280
VAS	66.57 (66)	64.29 (65)	<0.001
SBP	139.32 (140)	137.91 (140)	0.196
DBP	89.19 (90)	87.77 (90)	0.395

*Wilcoxon signed-rank test

This increase in knowledge would also be expected to cause a change in attitude of patient towards medications, and hence resulting in improved adherence to medication. This significant increase in the patient's level of knowledge regarding hypertension and its management is in accordance with previous findings showing that education programs for patients can be used to increase knowledge of patients about hypertension and result in better understanding and management of hypertension (Roca *et al*., 2003; Saounatsou *et al*., 2001). Certain important features should be taken into considerations while education about health is being designed and given to the patients such as linguistic, cultural and needs of literacy. Hypertension related education should be designed flexible enough so as to fulfill the requirements of the patient.

In Pakistan, within this context, 66% of the population resides in the rural areas of the country (Shaikh and Hatcher, 2004). Illiteracy which is compounded by poverty, lack of water and sanitation facilities and low status of women has put a deep impact on indicators of health (Karim and Mahmood, 1999).

In rural areas, cultural beliefs and practices most often lead to home remedies or self-care and also consultation with the traditional healers (Nyamongo, 2002). Majority of population in Pakistan having belief in spiritual healers, hakeems, homeopaths, clergymen or even quacks utilize alternative therapies (Karim and Mahmood, 1999). However, in the urban areas of Pakistan, more importance has now been given to the pharmaceutical-based treatment with educational transformation and modernization. On the other hand, so far as rural population of Pakistan is concerned, a slow shift can be observed in the same direction. Therefore, while designing and implementation of an educational program for patients, existing concepts and beliefs must be addressed. Only then educational interventions for patients can result in greater acceptance of biomedical concept about illness and medication which is in turn of utmost importance while managing chronic diseases.

Statistical analysis of attitudes and beliefs of patients about use of medication and adherence before and after the educational intervention showed a positive shift among the IG. This change in the level of perceived importance of medication adherence in patients was significant (P<0.001) in both intragroup (IG and CG) and intergroup (pre- and post-IG) comparisons as shown in tables 2 and 3. Education of patients about self-management can play an important role in achieving optimal pharmaceutical care. That education can improve knowledge of patients and understanding of their conditions, coping behavior and medication adherence to treatment. These changes in beliefs are consistent about medication with other reported studies that shows that education-based interventions can lead to modifications in attitudes of patients towards therapy and improve adherence to medication (Horne, 1993; Magadza *et al*., 2009; Viswanathan *et al*., 2005). It was suggested in a study that attitude and behavior of hypertensive patients can be changed by providing them with information and ensuring that they understand nature of hypertension (Chabot *et al*., 2003). Schedlbauer *et al*. reported that adherence to medication was increased by 13% by improving patient education and information (Schedlbauer *et al*., 2010). A significant increase was reported in medication adherence among the interventional group after completing the intervention (Saleem *et al*., 2015).

Although, it is apparent from our study that adherence levels increased yet an important point to be kept in

consideration is the long-term effect of education program on the status of medication adherence. Several interventions have been conducted in developing countries regarding management and treatment of diseases. Analysis of these interventions is done during a specific duration of time and hence long-term effect is also often neglected. As a result, these interventions may prove to be purposeless and in turn results in a heavy loss to the patient as well as health care system. Therefore, continuous medical education (CME) is recommended which should be provided even after completion of intervention, so that patients can retain optimum knowledge and obtain benefit from it.

It has often been reported that hypertensive patients experience a considerable reduced HRQoL in comparison to normotensive individuals (Gusmão *et al*., 2009; Li *et al*., 2005). Wang *et al*. conducted a study in China and reported a considerable reduction in HRQoL among patients of hypertension which became even worse in patients with comorbid conditions (Wang *et al*., 2009). While Gusmão *et al*. showed in the established literature that physical function was negatively affected by hypertension (Gusmão *et al*., 2009). A greater effect was also reported on mental component score as well as total score of quality of life (Ogunlana *et al*., 2009). A highly significant improvement in quality of life (QoL) was also reported in the intervention group (Kandasamy *et al*., 2018). Since hypertension is an asymptomatic condition, therefore it is considered that poor HRQoL in hypertensive patients is due to inadequate knowledge regarding hypertension, complications or comorbidities and/or adverse effects after using antihypertensive medicines (Soni *et al*., 2010). In India, intervention provided by pharmacist was also shown to enhance HRQoL in the patients of hypertension (Shahina *et al*., 2010).

In our cohort of patients with hypertension, HRQoL was measured as low. HRQoL increases in the IG after intervention (EQ-5D 0.73±0.12, VAS 69.39±5.90). No significant change in HRQoL was found among the CG, however, VAS scores significantly reduced between pre- and post- CG. It was highlighted in a previous study that interventions provided by pharmacist can produce both a positive as well as negative effect on HRQoL of the patients (Côté *et al*., 2005). The current study provided data that suggest that interventions provided by pharmacist can affect outcomes related to hypertension in the community, with improvement in HRQoL of hypertensive patients. The results of our study also showed that the blood pressure control also improved and lower systolic (131.81±10.98 mmHg) and diastolic blood pressures (83.75±6.21 mmHg) were observed among the patients of IG.

The effectiveness of intervention program was clearly evident from the outcomes of post-interventional analysis. It also changed the perceptions and practices. Anyhow, such interventional services should be constantly provided to achieve and maintain its desired useful outcomes. Providing education to the patients regarding hypertension may play a vital role by encouraging to take responsibility for and by supporting them in the day to day control of their condition. Educational intervention also changed the beliefs of regarding medications and long-term use. Additionally, the patients and healthcare professionals recognized and appreciated pharmacist's intervention in the current study. The enrolled patients also suggested that such education-based interventions must be conducted for other diseases besides hypertension. The major proportion of the patients in the study expressed that it is important to ensure that follow up visits for pharmacist's intervention should not be limit in terms of number and should be provided over an extended time period in order to augment the effects of intervention. Furthermore, it was also suggested by the patients that such educational programs should also be initiated at the community level. The study patients also expressed that they were comfortable to articulate their fears, feelings and thoughts with the pharmacist that was not possible while visiting the physicians. Therefore, a multipronged national health policy is required to reduce the burden of such chronic diseases. In addition, improvement in providing primary as well as tertiary healthcare is vitally important with a strong system of monitoring in place (Afzal and Yusuf, 2013).

CONCLUSION

Our study showed that educational programs for patients are helpful in enhancing levels of knowledge about hypertension, improving adherence to medication and an increased blood pressure control in patients. This increase in turn leads to an improved HRQoL. The pharmacist's intervention also tailored Patient's beliefs about medication and long-term use. The pharmacist's intervention was successful as it managed to decrease as well as control the blood pressure which is a positive indication of a successful hypertensive therapy. The results of post-intervention phase indicated that pharmacist's intervention had positive effects on knowledge about hypertension, medication adherence, control of blood pressure and HRQoL and resulted in significant improvements. In the intervention group, the SBP as well as DBP was also reduced. This study supports that pharmacist has effective role in improving the healthcare system, hence leading to the useful hypertension outcomes.

LIMITATIONS

A small sample of hypertensive patients was selected from a tertiary care public sector hospital in Islamabad, Pakistan to conduct the study and hence the results cannot

be generalized to whole hypertensive patients of the country.

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